

Child Engagement in the Transition to School: Contributions of Self-Regulation,  
Teacher–Child Relationships and Classroom Climate

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### Abstract

Framed by a systemic-ecological model of engagement, this study examined cross-grade patterns of behavioral engagement in learning over kindergarten and first grade and the contributions of child inhibitory control and facets of the classroom context (i.e., teacher–child relationship quality, perceived peer–teacher conflict, and classroom organization) to behavioral engagement over this period. Participants were 145 children. Behavioral engagement was rated by teachers in kindergarten, and it was both observed by independent observers and rated by teachers in first grade. At the beginning of kindergarten, inhibitory control was observed and kindergarten teachers reported on teacher–child relationship quality. In first grade, observers rated the quality of classroom organization. Multilevel analyses indicated that inhibitory control, closer teacher–child relationships and lower levels of perceived peer–teacher conflict contributed to higher levels of behavioral engagement in kindergarten, which in turn combined with the quality of classroom organization in first grade to predict both observed and teacher-reported engagement in first grade. The results suggest that multiple contributors at the individual, dyadic, and classroom-level are relevant for behavioral engagement over the important period of transition to school.

*Keywords:* Engagement in learning; School transition; Self-regulation; Teacher–child relationship; Classroom organization;

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The transition to primary school has been considered a critical developmental period with important implications for child school success (Pianta & Rimm-Kaufman, 2006; Rimm-Kaufman & Pianta, 2000). Over the transition to school, children experience developmental changes as well as changes in their learning environments that pose particular social and academic challenges (Perry & Weinstein, 1998; Rimm-Kaufman & Pianta, 2000). For most children, changes involve moving from a relatively unstructured environment to a more formal, academically oriented one that usually expects them to sit still and to focus on academics for extended periods of time (La Paro, Rimm-Kaufman, & Pianta, 2006; Sink, Edwards, & Weir, 2007). It has been suggested that how well children are coping with these changes is linked to behavioral engagement in learning (Pianta & Rimm-Kaufman, 2006). Behavioral engagement can be defined as student's active involvement in the classroom tasks, including complying with classroom rules and routines, completing tasks responsibly, persisting and concentrating on tasks, and exhibiting self-directed behavior (Birch & Ladd, 1997; Fredricks, Blumenfeld, & Paris, 2004; Hughes & Kwok, 2006). Several studies have consistently demonstrated that behavioral engagement is associated with school achievement (Fredricks et al., 2004; Greenwood, Horton, & Utley, 2002; Hughes & Kwok, 2007; Ladd, Birch, & Buhs, 1999; Ladd & Dinella, 2009; Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009). Given the critical importance of behavioral engagement, it seems important to identify processes that promote it during the school transition. However, there is relatively little research on the potential antecedents of behavioral engagement across both the kindergarten and first-grade years. Available

evidence has examined engagement antecedents within one school year and little is known about how behavioral engagement evolves from kindergarten to first grade and what fosters behavioral engagement in this cross-grade period. In view of these limitations, the purpose of this study is to examine how individual child characteristics (i.e., self-regulation) and facets of the classroom context (i.e., teacher-child relationship quality, classroom organization) combine to predict behavioral engagement across kindergarten and first grade. Understanding the contributions of child and contextual antecedents to behavioral engagement in this two-years transition period can be critical for fully understanding child school success.

### **Behavioral engagement as a key indicator of learning**

Over the past years, research has consistently pointed out that engagement in learning is a key contributor to children's school success (Finn & Zimmer, 2012; Fredricks et al., 2004; Reschly & Christenson, 2012). Several studies have shown that behavioral engagement predicts students' learning and achievement in elementary school. For instance, in one study, Ladd and Dinnella (2009) found long-term associations between early school engagement and academic progress from first to eighth grades. In another study, findings showed that engagement was an important prerequisite for achievement in kindergarten (Ladd et al., 1999). Findings have additionally shown that children who are engaged in learning were likely to benefit more from classroom instruction and to elicit more positive responses from teachers and peers (Ladd et al., 1999). Several studies have also consistently pointed out that behavioral engagement is crucial for successful participation in school and identification with school (Reschly & Christenson, 2012). The ability to stay engaged in classroom is important because theoretically it encompasses processes directly linked to

learning, and it is conceptualized as a learning-related process (Lawson & Lawson, 2013). Practically, behavioral engagement is often a concern reported by kindergarten teachers (Rimm-Kaufman, Pianta, & Cox, 2000). Thus, engagement is not only relevant for improving achievement outcomes but also to foster learning across academic, social-emotional, and behavioral domains (Reschly & Christenson, 2012). Because engagement is so closely linked to outcomes of interest, researchers have increasingly recognized that engagement is, in itself, a relevant outcome of schooling (Finn & Zimmer, 2012).

Although there are many conceptualizations of engagement, there is general agreement that it encompasses multiple dimensions (Skinner, Furrer, Marchand, & Kindermann, 2008). At a more global level, engagement refers to the quality of child's involvement with the learning activities and represents a direct pathway to learning (Lawson & Lawson, 2013). Conceptually, according to the systemic-ecological model (Bronfenbrenner & Morris, 1998), engagement is a proximal process that involves children's interactions with materials, teachers, and peers that produce learning and promotes development (Downer, Rimm-Kaufman, & Pianta, 2007). This study focuses on the behavioral dimension of engagement, in specific the child's engagement in learning, which refers to child's attention and persistence in the learning activities (Fredricks et al., 2004; Lawson & Lawson, 2013). In the early school years, this dimension is seen as particularly relevant (Mahatmya, Lohman, Matjasko, & Farb, 2012) as it refers to active, goal-directed, persistent, and focused interactions with academic activities. Research has shown a decline in levels of engagement throughout school (Skinner et al., 2008), making the early years of schooling even more important for understanding and enhancing engagement. While the links between behavior

engagement and achievement are well established, the examination of its predictors is less well investigated (Ladd & Dinnella, 2009). In the present study, we sought to understand how individual child characteristics and classroom context factors jointly shape behavioral engagement during the school transition.

### **Behavioral engagement, self-regulation and inhibitory control**

Among individual characteristics and skills, self-regulation can be especially influential to behavioral engagement in learning. There has been growing evidence suggesting that children's self-regulation is associated with classroom adaptive behavior and academic performance (Blair & Razza, 2007; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Liew, Chen, & Hughes, 2010; Valiente et al., 2011; Valiente, Lemery-Chalfant, & Swanson, 2010). Self-regulation from a behavioral/temperament-based approach refers to the ability to voluntarily inhibit some behaviors, activate others, and focus or shift attention as needed (Blair & Razza, 2007; Kochanska, Murray, & Coy, 1997; Liew, 2012; Smith-Donald, Raver, Hayes, & Richardson, 2007). An increasing number of research findings show positive links between self-regulation and academic skills and school achievement (Blair & Razza, 2007; McClelland et al., 2007). Self-regulation has also been positively linked to school liking and social adjustment (Eisenberg et al., 2001; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Valiente, Lemery-Chalfant, & Castro, 2007). Children's self-regulation is likely to be important for behavioral engagement as well, because in order to act appropriately in classroom activities, children need to be able to manage their behavior and modulate their attention (Eisenberg, Valiente, & Eggum, 2010).

Although there are some studies showing links between self-regulation and behavioral engagement (Brock, Rimm-Kaufman, & Nathanson, 2009; Rimm-Kaufman

et al., 2009), the results warrant further investigation because these links were generally examined within one school year. For instance, Brock et al. (2009) found that self-regulation predicted observed behavioral engagement, but the study was conducted within the kindergarten year. There is a clear need to investigate whether self-regulation continues to be an important contributor to engagement in first-grade when other variables, namely the classroom processes that children experience directly, come into play. One aim of this study is to elucidate the associations between self-regulation and cross-grade patterns of behavioral engagement while considering relational and classroom antecedents of engagement as well. To operationalize self-regulation, we consider a central aspect of children's self-regulation—their inhibitory control (Blair & Razza, 2007) —which refers to the ability to deliberately inhibit a dominant response in order to enact a subdominant one (e.g., slowing motor activity) (Kochanska, et al., 1997; Kochanska, Murray, & Harlan, 2000).

### **Teacher–child relationships and engagement in learning**

In addressing the classroom social context, scholars have argued for the importance of considering both dyadic or relational and classroom-level facets (Pianta, Hamre, & Stuhlman, 2003). The affective quality of dyadic teacher-child relationships is a dimension of the social context that has received increased attention and can play an important role in behavioral engagement. Consistent with the attachment perspective, positive teacher–child relationships can be characterized as warm, close, and supportive (Pianta, 1999). These kind of relationships are likely to provide a context in which children feel emotionally secured and confident, which encourages active exploration of the learning environment. A positive relationship with the teacher may be particularly important in the school transition to help children cope with novel academic and social



situations (Hughes & Kwok, 2006). Research has consistently indicated that positive teacher–child relationship predict a higher academic and social competence (Birch & Ladd, 1997; Buyse, Verschueren, Verachtert, & Van Damme, 2009; Hughes & Kwok, 2006; Hamre & Pianta, 2001). In contrast, relationships characterized by high levels of conflict and negativity have been found to be associated with higher levels of child externalizing behavior and lower levels of achievement (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Buyse et al., 2009; Doumen, Verschueren, Buyse, Germeijs, Luyckx, & Soenens, 2008; Hamre & Pianta, 2001; Pianta & Stuhlman, 2004; Silver, Measelle, Armstrong, & Essex, 2005).

There is also evidence suggesting positive links between the quality of teacher–child relationships and teacher-reported engagement in learning (Birch & Ladd, 1997; Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012; Hughes & Kwok, 2006; Hughes, Luo, Kwok, & Loyd, 2008; Ladd et al., 1999). It has been shown that supportive relationships are predictive of perseverance in academic tasks, initiative, and cooperative participation (Birch & Ladd, 1997; Furrer & Skinner, 2003; Hughes & Kwok, 2006), while conflictual relationships are related to lower levels of classroom engagement (Hughes, Wu, Kwok, Villarreal, & Johnson, 2012). For example, in a series of studies, Hughes and colleagues (Hughes & Kwok, 2006; Hughes et al., 2008; Hughes et al., 2012) have reported associations of teacher–student relationship quality with behavioral engagement that, in turn, was related to academic achievement and social adjustment. However, most evidence is limited to teacher reports of engagement. Examining behavioral engagement from other perspectives, particularly from external observers, can provide additional insights with respect to which facets of behavioral engagement are influenced by relationship quality. Furthermore, it continues to be

important to understand whether relationship quality remains a relevant predictor in the cross-grade period. Because closeness and conflict have been shown to be distinct dimensions of teacher–child relationships (Birch & Ladd, 1997; Doumen et al., 2009; Pianta & Stuhlman, 2004), in this study, these two dimensions will be examined independently.

### **Teachers’ relationships with classroom peers**

Dyadic relationships are assumed to be embedded in the larger network of classroom interactions (Howes et al., 2011; Pianta et al., 2003), which may also impact the child’s engagement. Specifically, we contend that children are not only affected by their own relationship experiences with the teacher, but also by the quality of their classmates’ relationships. As conflict is the most visible relationship dimension within the classroom (Doumen et al., 2009), we focus on the degree of teachers’ conflict with the child’s classroom peers. Higher rates of disharmonious interactions and conflict with the teacher can create an atmosphere that may increase stress and reduce engagement in learning, beyond the influence of the nature of the dyadic relationship the child has with the teacher (Howes, 2000). Many conflictual relationships as perceived by the teacher can contribute to a negative global affective climate characterized by frequent disruption and disharmony with the teacher that may interfere with learning and motivation. Prior research suggests that characteristics of classroom social contexts affect student behavior (Perry & Weinstein, 1998; Thomas, Bierman, & The Conduct Problems Prevention Research Group, 2006). Specifically, classrooms characterized by high levels of student aggression have been found to contribute to the development of child aggressive behavior problems. Although links between perceived peer–teacher conflictual climate and child engagement have yet to be explored, it has

been shown that negative or conflictual peer–teacher interactions are associated with a negative climate in the classroom and tend to negatively affect child social outcomes (Howes et al., 2011). Evidence also suggests that the overall negative emotional climate has a detrimental effect on children’s social adjustment, beyond and above individual teacher-child relationships (Howes, 2000; NICHD Early Child Care Research Network, 2003). Thus, when a classroom environment has a high proportion of conflictual relationships between the teacher and classmates, the general interaction tone is expected to be hostile with a prevalence of negative and angry expressions of affect, which can adversely affect classroom behavior for all children.

It is also possible that classrooms characterized by high levels of conflict create a challenging climate for teachers who may need to invest more time to attend to conflictual relationships and to deal with children's noncompliance. Under these circumstances, interruptions in classroom activities can be more frequent making it harder for children to sustain high levels of engagement and persistence in learning. It is important to note that the quality of the teacher–child relationship involves not only overt behavioral interactions but also the representations and feelings of the partners over time (Pianta et al., 2003). When teachers perceive a high proportion of their relationships with children as problematic and hostile, their negative expectations can further amplify potential interferences on classroom activities. Hence, we think that high concentrations of conflictual relationships in classrooms can have a negative influence on engagement in learning. This study will be the first to examine how individual teacher–child relationships and perceived negative peer–teacher climate operate simultaneously and are linked to children’s engagement in learning.

### **Classroom organization and engagement in learning**

In addition to child and peer relationships with teachers, the organizational climate can also play a particularly important role in supporting children's behavioral engagement (Fredricks et al., 2004; Hughes & Kwok, 2007; Ponitz et al., 2009). Organizational support has been theoretically aligned with children's level of behavioral engagement (Downer, Sabol, & Hamre, 2010). In classrooms with high-quality classroom organization, teachers use proactive behavior management approaches to prevent misbehavior, monitor the classroom closely to keep children involved in the academic tasks, and establish predictable and consistent routines so that children know the expectations for their behavior (Cameron, Connor, & Morrison, 2005; Emmer & Stough, 2001; La Paro, Pianta, & Stuhlman, 2004). Well-organized teachers also use time productively to minimize down time and provide a variety of materials that support children's active engagement in the activities (Downer et al., 2010; Pianta, La Paro, & Hamre, 2008).

Several potential pathways have been suggested to explain how high-quality classroom organization can promote behavioral engagement (Ponitz et al., 2009). First, a well-organized classroom may improve instructional time in the classroom by minimizing distractions and time spent on transitions. Well-managed classrooms can also support children's internal management of their own behavior by setting up consistent routines and well-organized tasks (Cameron et al., 2005). Because children know what is expected from them, children can more easily develop their own working habits as well as spend more time in independent work (Cameron et al., 2005; Ponitz et al., 2009).

Higher classroom quality has been shown to promote higher achievement, greater engagement, and higher on-task behavior (Cameron, Connor, Morrison, &

Jewkes, 2008; Pianta, La Paro, Payne, Cox, & Bradley, 2002; Rimm-Kaufman, La Paro, Downer, & Pianta, 2005, Rimm-Kaufman et al., 2009). In one study in kindergarten, higher classroom quality predicted higher achievement through children's behavioral engagement (Ponitz et al., 2009). In another study, Rimm-Kaufman and colleagues (2009) found that effective classroom organization, contrary to emotional and instructional support, was associated with children's greater self-control, higher behavioral engagement, and less time spent off-task. In fact, there is recent evidence suggesting domain-specific associations between specific domains of teacher-child interactions and specific child outcomes in early childhood settings, such that classroom organization is associated with social and self-regulation skills, while other domains of teacher-child interactions, namely emotional and instructional support, are not (Hamre, Hatfield, Pianta, & Jamil, 2014). It seems, therefore, particularly important to further analyze the specific role of classroom organization on engagement in learning over the transition to school.

The examination of the contribution of organizational climate to behavioral engagement in first grade is still limited though. While the organizational climate can be important both in kindergarten and first grade, understanding its role can be particularly relevant in first grade. First grade can be especially demanding for children because, relative to kindergarten, most classroom activities impose more rigid instructional requirements and demand greater levels of independence and self-control from children (Ponitz et al., 2009; Sink et al., 2007). Understanding how first-grade classroom organization contributes to behavioral engagement can therefore provide additional information about the ways teachers can better support children's involvement in the classroom activities.

In sum, existent research has identified relevant antecedents of behavioral engagement at the child and classroom level, but at the present little is known about whether these antecedents continue to be important across both the kindergarten and first-grade years. There is a need to further investigate the causes of continuity in early school behavioral engagement, particularly in this two-year period of transition to school, where continuous adaptations to new set of rules and expectations are required. Moreover, examining the transition across these two important years can be especially relevant in several European countries like Belgium that are expanding early childhood access. Indeed, among European and American countries, Belgium has one of the highest percentages of three-year-olds attending early childhood education (OECD, 2006). As such, many children attend educational settings from very young age and for longer periods of time, making it important to understand how changes in the learning environments affect children's behavioral engagement over longer periods of time rather than just for one year. An additional important limitation of current research is that insufficient information has been gathered about how these individual and classroom context antecedents combine to foster behavioral engagement (Downer et al., 2007). As contended by systemic-ecological models children develop through interactions within multiple interrelated systems (Bronfenbrenner & Morris, 1998), and the influence of a factor can only be understood when other factors are considered (Bronfenbrenner & Morris, 1998). Researchers, however, have seldom considered the combination of individual and contextual determinants of behavioral engagement (Downer et al., 2007). Importantly, it remains relatively unexplored the examination of both dyadic and classroom-level contributors to behavioral engagement. Furthermore, few studies have used observations to assess behavioral engagement in early school

years, as most have relied on teacher reports (Roorda, Koomen, Spilt, & Oort, 2011). While teacher reports can provide information on engagement in learning over time, observational methods can help capture the moment-to-moment task engagement, thus contributing to understand the more dynamic components of behavioral engagement (Eccles & Wang, 2012). Consequently, to ensure a more comprehensive picture of behavioral engagement, there is a need to collect information from multiple methods, calling for further research in this area.

### **The present study**

Framed by systemic-ecological models (Bronfenbrenner & Morris, 1998), the purpose of this study is to examine the extent to which behavioral engagement shows stability across kindergarten and first grade considering the relative predictive contributions of individual and classroom contextual factors. We examine behavioral engagement across this two-year period and assess engagement through teacher reports and observations in first grade. Specifically, we investigate a) whether behavioral engagement in first grade is predicted by prior engagement in kindergarten within the influence of classroom features in first grade; b) the extent to which inhibitory control, teacher–child relationship, and perceived peer–teacher conflict predict behavioral engagement in learning in kindergarten; and (c) the same set of predictors continue to play a role in behavioral engagement in first grade through their influence on behavioral engagement in kindergarten.

First, the extent to which behavioral engagement is stable in this cross-grade period is examined. We expect to find positive associations over time and anticipate that stability will be stronger for teacher reports than for the links between teacher reports and observations. Second, the relative contribution of observed inhibitory control, the

quality of teacher–child relationships and levels of perceived peer–teacher conflict to behavioral engagement in learning is investigated. Based on previous research indicating associations between inhibitory control and achievement, it is expected that high levels of inhibitory control foster behavioral engagement. More specifically, we hypothesize that the ability to effortfully inhibit behavior is linked to children’s involvement in learning activities. It is also expected that higher levels of individual teacher–child closeness and lower levels of individual teacher–child conflict will be associated with higher levels of behavioral engagement in learning. In addition, it is hypothesized that higher levels of perceived conflict in the relationships between teacher and classroom peers will be predictive of lower levels of behavioral engagement. Finally, building on previous research that demonstrated an association between organizational climate and behavioral engagement in kindergarten (Ponitz et al., 2009; Rimm-Kaufman et al., 2009), we investigate the contribution of classroom organization quality to behavioral engagement in learning in first grade against the influence of levels of behavioral engagement in kindergarten. It is expected that high quality of classroom organization will be a key contributor of behavioral engagement in learning.

This integrative focus on behavioral engagement in the transition to school, by considering individual, dyadic, and classroom-level factors, and by considering a two-years period, is important to extend our understanding about the best ways to support behavioral engagement in the classroom.

## **Method**

### **Participants**

The current sample consisted of 145 children and their kindergarten and first-



grade teachers. Participating children included 75 girls and 70 boys. Their mean age at the beginning of first grade was 6 years and 2 months ( $SD = 3$  months). Children were enrolled in 30 kindergarten classrooms in schools situated in Flanders, Belgium. Classroom size in kindergarten ranged from 8 to 29 ( $M = 20.7$ ;  $SD = 4.64$ ) and the number of participating children per classroom was on average five children ( $SD = 1.75$ ), ranging between 1 and 9, with the majority of classrooms (85%) having four or more participating children. Kindergarten teachers had, on average, 19 years of teaching experience ( $SD = 9.04$ ), and 96.6% of the teachers were women. In first grade, children were enrolled in 35 first-grade classrooms. Classroom size ranged from 11 to 24 ( $M = 18.0$ ;  $SD = 2.94$ ) and the number of participating children per classroom was on average 4.15 ( $SD = 1.72$ ), with most of the classrooms (90%) having 3 (30%) and 4 or more (60%) participating children. First-grade teachers had on average 14 years of teaching experience ( $SD = 8.86$ ), and 80.0% of the teachers were women. All kindergarten and first-grade teachers had a professional certificate in education. Teachers in Belgium are required to hold the degree of Bachelor in education, which involves the completion of a 3-years training program at a university college. Early education services are either public or private, but all of them publicly funded, and free for children (OECD, 2006). The coverage rate for children from three years is virtually universal and parents have freedom to choose schools. Regarding curriculum, teachers follow the same core learning goals (i.e., physical education; art education; language; world studies, and mathematics), but have autonomy to take decisions regarding teaching methods.

Among parents, the majority (respectively, 94% mothers and 92% fathers) had the Belgian nationality. For mother's level of education, 80.4% attended college or university, 13.4% completed high school and 6.3% attended some years of secondary

school or completed primary school. These percentages are similar to Flemish educational levels (OECD, 2013).

Participants in the current sample were part of a larger short-term longitudinal study with data waves in preschool, kindergarten, and first grade (Buyse, Verschueren, & Doumen, 2011; Doumen et al., 2008). The longitudinal study followed intensively a core group of 169 children, to whom all classroom measurements were administered, including teacher-rated instruments, self-evaluations, and observations. The sample for the current study consisted of 145 children for whom inhibitory control data in kindergarten and follow-up data in first grade were available. Some children did not participate in the current sample ( $n = 24$ ) due to changing schools, and parents refusing to continue to participate. Comparison of the children in the current sample with children from the dropout group showed no systematic differences regarding gender,  $\chi^2(1) = 0.83$ , *ns*, nor on closeness and conflict scores at the beginning of kindergarten, respectively,  $t(167) = -0.499$ , *ns*, and  $t(167) = -0.499$ , *ns*.

## **Procedures**

Children's inhibitory control was observed at the very beginning of kindergarten (September–October). The child was videotaped while performing the task in a separate room at school. After training for coding, researchers independently scored the observations. Parents completed a demographic questionnaire including several background questions, namely, mothers' educational level, child's gender, and age. In kindergarten, data were collected in two waves. Teacher–child relationship quality was assessed with teacher reports at the beginning (October–December) and end (April–June) of the kindergarten school year. In the last wave (April–June), kindergarten teachers rated children's behavioral engagement. After the transition to first grade, two

waves of data collection took place. Researchers carried out classroom observations at the beginning of the school year (September–October). At the end of the school year, first grade behavioral engagement was assessed both with teacher ratings and observations. First-grade teachers completed a questionnaire on behavioral engagement. In addition, trained observers, who were not involved in the classroom observations, rated behavioral engagement after several observational periods throughout the school day.

## Measures

**Self-regulation: Inhibitory control.** Inhibitory control was assessed using two drawing tasks from a behavioral battery designed to assess effortful and inhibitory control (Kochanska et al., 1997). The tasks tap the child's capacity to suppress a dominant behavior by capturing his or her ability to slow down fine-motor activity (Kochanska et al., 2000). In these tasks, Circle and Star, children were asked to trace the geometric figure along the pattern. For each task, children participated in three trials, with different instructions for speed (at regular speed, fast, and slow). In Trial 1, children completed the task without any instructions for speed. In Trial 2, children were asked to draw as quickly as possible and, in Trial 3, children were asked to draw as slowly as possible. Coding involved the duration in seconds of each trial. The final score was the difference between the slow and fast trials, with higher scores indicating more inhibitory control. In order to reach normality, the square root of these scores was calculated. These scores for Circle and Star were highly intercorrelated ( $r = .69, p < .001$ ), and, therefore, averaged and standardized to a mean of 0 with a standard deviation of 1. These tasks have been used in several studies examining inhibitory control and have been shown to be reliable and valid with young children (Dennis,

Brotman, Huang, & Gouley, 2007; Gusdorf, Karreman, van Aken, Dekovic, & Tuijl, 2011; Kochanska, Barry, Jimenez, Hollatz, & Woodard, 2009; Kochanska, Coy, & Murray, 2001; Liew et al., 2010). In the current study, intercoder reliabilities for both tasks were satisfactory, with ICCs for the duration of the slow and fast trials being .99 and 1.00 for Circle and .92 and 1.00 for Star.

**Teacher–child relationship quality.** The Closeness and Conflict subscales of the Dutch authorized version of the Student–Teacher Relationship Scale (STRS; Koomen, Verschueren, & Pianta, 2007) were used to assess teacher perceptions of the quality of the teacher–child relationship. The STRS is a widely used self-report measure of teacher-perceived conflict and closeness with each student. The Closeness scale includes 11 items that measure the degree of warmth, affection, and open communication present in the teacher–child relationship (e.g. ‘‘I share an affectionate, warm relationship with this child’’). The Conflict scale includes 11 items designed to tap the degree of antagonism, disharmony and conflict within the relationship (e.g., ‘‘This child and I always seem to be struggling with each other’’; Pianta, 2001). Teachers rate items on a 5-point scale ranging from 1 (definitely does not apply) to 5 (definitely applies). The Closeness and Conflict scales have shown validity and reliability, including the adapted version of the STRS (Koomen, Verschueren, van Schooten, Jak, & Pianta, 2012; Spilt, Koomen, & Jak, 2012; Pianta, 2001). Scores on the STRS correlated with academic skills (Hamre & Pianta, 2001), behavioral adjustment (Birch & Ladd, 1997), as well as with observational measures of the quality of the teacher–child relationship (Birch & Ladd, 1997; Doumen et al., 2009, 2012). In the current study, internal consistencies were very high (Cronbach’s alphas = .87 and .87 for Conflict, and .89 and .93 for Closeness). Giving the high correlations across time

points within each dimension ( $r = .75, p < .05$  and  $r = .72, p < .05$  for Conflict and Closeness, respectively), scores were averaged across the two time points for Conflict (Cronbach's alpha = .85) and Closeness (Cronbach's alpha = .84).

**Perceived peer–teacher conflict.** To address some of the limitations of using a classroom composite of conflict levels, namely, the double inclusion in the analyses of the same score of child's conflict (in both within-level and between-level parts of the model), we created a within-level variable describing the levels of conflict between peers and teachers as perceived by the teacher that each individual child experiences. Specifically, for each child, we computed an average score on the conflict subscale of the STRS for the other children in each child's classroom who participated in the study. This measure therefore taps the conflictual levels that are presented in the classroom for each particular child, hereby differentiating it from the type of relationship that the child has with his/her teacher. To compute this variable, we used all the available data from the larger study, including data on peers who were not participants in this study but were only participating in the larger study ( $n = 209$ ). On average, the perceived peer–teacher conflict for each child was computed using data from nearly 8 peers. For nearly 88% of the children, the perceived peer–teacher conflict was computed based on 6 peers or more, and for 42% of children, it was based on 10 peers or more.

**Observed classroom organization.** For observed classroom organization, we used the Classroom Assessment Scoring System (CLASS; La Paro, Pianta, Hamre, & Stuhlman, 2002), which is an observational measure of the quality of classroom interactions that groups several classroom dimensions into three major domains: Emotional Support, Classroom Organization, and Instructional Support. The domain of interest for this study, Classroom Organization, includes three subdimensions: Behavior

Management, Productivity, and Instructional Learning Formats. Behavior management considers the extent to which teachers use effective methods to monitor, prevent, and redirect misbehavior (e.g., providing clear expectations, monitoring). Productivity considers how well teachers maximize time spent in learning activities (e.g., clear routines, smooth transitions). Instructional learning formats reflects the degree to which teachers facilitate activities and provide interesting materials to maximize children's engagement and ability to learn (e.g., using varied modalities). The research assistants observed teacher–child interactions for three hours and scored classrooms on a 7-point scale from low (1, 2), middle (3, 4, 5) to high (6, 7) on each dimension, using the manual, which provided detailed examples of teacher behaviors and classroom interactions for each dimension. The scores of the three dimensions were aggregated into a single score for Classroom Organization (Cronbach's  $\alpha = .76$ ). The CLASS has been widely used in the USA and in other European countries, with several studies showing that it provides reliable, valid assessments (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008; Cadima, Leal, & Burchinal, 2010; Curby, Rimm-Kaufman, & Ponitz, 2009; Hamre & Pianta, 2005; Hamre, Pianta, Mashburn, & Downer, 2008). For initial training, which was conducted before the certified CLASS training was available, the research assistants contacted the authors of the CLASS and conducted pilot observations. For inter-rater reliability, two observers evaluated independently 20% of the classrooms. The inter-rater reliability, based on intraclass correlation, was adequate,  $ICC = .70$ .

**Behavioral engagement in learning.** Two measures were used to assess child behavioral engagement in learning: one teacher-reported measure, the Teacher Rating Scale of School Adjustment (TRSSA; Birch & Ladd, 1997) both at the end of the

kindergarten school year and first grade, and one observation scale, the Behavior Assessment System for Children—Student Observation Scale (BASC SOS; Reynolds & Kamphaus, 1992) at the end of first grade. The Independent Participation subscale of the Teacher Rating Scale of School Adjustment (TRSSA; Birch & Ladd, 1997) was used to assess teachers' perceptions of children's engagement in learning at the end of the kindergarten school year and at the end of first grade. This subscale includes 9 items that measure the extent to which children work independently, and display initiative in the classroom (e.g., "Works independently"). Teachers rate each item on a 3-point scale, from 1 (does not apply) to 3 (certainly applies). Previous research has shown that this scale taps the kind of engagement that is influenced by the classroom environment (Stipek & Byler, 2004). In line with previous studies (Birch & Ladd, 1997) showing high reliabilities, with Cronbach's alphas exceeding .75, the internal consistency in the current sample was high (respectively,  $\alpha = .89$  and  $\alpha = .87$  in kindergarten and first grade). To assess the predictive validity of this measure, we tested the association between behavioral engagement and language scores at the end of first grade. The language scores were obtained using the Flemish version spelling test of a widely used and validated Dutch spelling test (Evers et al., 2002). The bivariate association between the engagement and language scores was moderate and positive,  $r = .50$ . In addition, we investigated the association between teacher-rated engagement and language scores, controlling for prior language skills and gender. Teacher-rated engagement remained associated with language scores,  $B = .39$ ,  $SE = .10$ ,  $p < .001$ , even after controlling for prior language skills and gender.

Children's behavioral engagement was also assessed at the end of first grade using the Behavior Assessment System for Children—Student Observation Scale

(BASC SOS; Reynolds & Kamphaus, 1992). The BASC SOS uses a time-sample recording format to gather information about behaviors in the classroom setting. Consistent with BASC SOS standard procedures, behaviors are coded sequentially using the coding schemes provided across 30-second intervals for 15-minute observation periods. Sixty-five specific target behaviors are grouped into 14 categories, including positive adaptive behaviors and problem behaviors, that are exhaustive and mutually exclusive. The manual provides a general definition of each one, as well as detailed examples.

Previous research reported adequate reliability and validity of the BASC-SOS (Baker, Clark, Maier, & Viger, 2008). For this study, following the authors' recommendations (Reynolds & Kamphaus, 1992), we computed the proportion of time the child spent engaged in adaptive classroom behaviors. Three out of 14 behavior categories corresponded to adaptive behaviors, namely, attending to instruction, talking appropriately with other students, and actively engaging with the learning task. The observation intervals in which these adaptive behaviors were observed were summed and divided by the total amount of the intervals. The classroom behaviors were rated by an independent coder, who did not rate the quality of classroom organization. Regarding predictive validity, the bivariate association between observed behavioral engagement and language scores was statistically significant,  $r = .18$ , and observed engagement also predicted language scores in first grade,  $B = .17$ ,  $SE = .08$ ,  $p = .041$ , after accounting for child gender and prior achievement, suggesting that, similarly to teacher-rated engagement, this measure is important for academic competence.

**Covariates.** Mothers' educational level was measured on a 6-point scale, ranging from low (primary school attendance) to high (university degree). Gender was



dummy coded (0 = girls; 1 = boys).

### **Data Analyses**

Descriptive and correlational analyses were conducted first. Next, path analysis models were conducted to examine child and classroom predictors of engagement in learning. Because children were nested in classrooms and one of the main predictors — Classroom Organization — was a classroom-level variable, a multilevel model was performed, with estimates properly accounting for the dependency among the observations within classrooms in first grade. Multilevel models offer several conceptual and technical advantages, by providing a single framework that combines information from within and between levels, contributing to more refined explanations of the outcomes (Heck & Thomas, 2009). In particular, the variables comprising the models can be specified at their correct hierarchical levels and therefore classroom-level variables can be defined correctly. Intraclass Correlation Coefficients (ICC) were computed to determine the proportion of variance at the classroom level. ICC values were, respectively, .16 and .18 for observed and teacher-rated engagement in learning. We performed a two-level model, with children at level-1 (within-level) nested within classrooms at level-2 (between-level). In the within part of the model, we tested whether inhibitory control, teacher–child closeness, teacher–child conflict, perceived peer–teacher conflict and background variables contributed to kindergarten engagement, as well as whether engagement in kindergarten contributed to engagement in first grade. In the first model, *observed* engagement in first grade was used as the outcome variable. We then performed a second model using *teacher-rated* engagement in first grade as the outcome variable. At this level, the intercepts were random effects that could vary across the classrooms and the slopes were fixed effects. In the between part of the

model, the intercept and residual variance of first grade engagement were estimated. The statistical software package Mplus version 6.1 (Muthén & Muthén, 1998-2010) was used to perform the analyses. To determine goodness of fit of the model, we used the following fit indices: the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR). The fit of the model is considered very good when RMSEA is less than or equal to .05, CFI exceeds .95, and SRMR is less than or equal to .08; the fit of the model is considered adequate when the RMSEA is less than or equal to .08 and CFI exceeds .90 (Hu & Bentler, 1999; Kline, 2005; MacCallum, Browne, & Sugawara, 1996). To account for missing data, multiple imputation using the Mplus software program was used. The procedure involves estimating predicted values for each variable iteratively based on the other variables in the model and subsequently combining the multiple imputed sets of results into a single set. This approach has been shown to be effective and more powerful than traditional ones (Baraldi & Enders, 2010). Based on recommendations by Graham, Olchowski, and Gilreath (2007), we created 20 imputed data sets. The variables in the imputation were children's inhibitory control, teacher–child closeness, teacher–child conflict, perceived peer–teacher conflict, teacher-reported engagement and observed engagement.

## **Results**

### **Descriptive Statistics**

Means and standard deviations of the variables are presented in Table 1. Overall, teachers reported low levels of teacher–child conflict and high levels of closeness. Perceived peer levels of conflict with the teacher also tended to be low. For teacher-reported behavioral engagement, teachers reported that children were on average

engaged in the classroom activities in kindergarten as well as in first grade. In addition, in first grade, children were observed to be engaged in approximately 78% of the total time of observation. Because inhibitory control scores were standardized into z-scores, its mean and standard deviation are not interpreted.

Table 1 also presents the within-level and between-level correlations among variables. As expected, there were small to moderate, positive associations between the measures of engagement in kindergarten and in first grade. In regard to kindergarten, child inhibitory control was positively related to behavioral engagement at the end of kindergarten. There was also a moderate, positive association between teacher–child closeness and engagement in kindergarten, whereas teacher–child conflict and peer–teacher conflict as perceived by the teacher were negatively related to behavioral engagement in kindergarten. In addition, the teacher–child relationship measures were associated with each other in the expected directions. Observed and teacher–report behavioral engagement in first grade were also negatively related to both teacher–child conflict and perceived peer–teacher conflict. When inspecting the associations with background variables, mothers' education was weakly and positively associated with inhibitory control and boys showed significantly lower levels of behavioral engagement in both kindergarten and first grade, including observed and teacher-report, as well as lower levels of teacher–child closeness and higher levels of teacher–child conflict. Because some associations with the background variables were statistically significant, these two background characteristics were controlled for in the path model.

### **Multilevel Path Analysis**

Two path models were performed. The first model testing whether children's inhibitory control, teacher–child relationship quality, and perceived peer levels of

conflict with the teacher contributed to kindergarten behavioral engagement and whether, in turn, kindergarten behavioral engagement and classroom organization contributed to first grade *observed* behavioral engagement is represented in Figure 1. All path coefficients represent standardized estimates. This model had an adequate fit:  $\chi^2(8) = 13.12, p = .02$ ; CFI = .930; RMSEA = .069, SRMR (individual level) = .043; SRMR (classroom level) = .055. The results at the individual level showed that engagement in kindergarten was further related to observed engagement one year later ( $\beta = .21, SE = .10, p = .031$ ). As expected, children with higher levels of teacher-reported behavioral engagement in kindergarten were likely to have higher levels of observed behavioral engagement in first grade. Furthermore, children's inhibitory control ( $\beta = .21, SE = .08, p = .012$ ), teacher-child closeness ( $\beta = .37, SE = .08, p < .001$ ), and perceived peer-teacher conflict ( $\beta = -.45, SE = .09, p < .001$ ) all directly contributed to behavioral engagement at the end of kindergarten, such that children with more inhibitory control, higher closeness to the teacher, and who experienced lower levels of perceived conflict between peers and teacher in the classroom were likely to have higher levels of engagement. Neither teacher-child conflict nor the background variables were found to contribute to behavioral engagement, when examined concurrently with the other predictors. The results at the within level additionally showed that behavioral engagement in kindergarten mediated the association between teacher-child closeness and high concentrations of perceived peer-teacher conflictual relationships, on the one hand, and behavioral engagement in first grade, on the other (respectively, estimate of indirect effect = 0.10;  $SE = 0.04; p = .017$  for closeness; estimate of indirect effect = -0.09;  $SE = 0.04; p = .020$  for perceived peer-teacher conflict). More specifically, higher levels of teacher-child closeness and lower levels of

perceived peer conflict with the teacher predicted higher levels of children's observed engagement in first grade, through its effect on children's engagement in kindergarten. No evidence for indirect effects of inhibitory control on first grade engagement was found.

Finally, at the between level of the model, the results showed that observed classroom organization was positively related to children's observed behavioral engagement ( $\beta = .58$ ,  $SE = .29$ ,  $p = .046$ ). The average engagement observed in first grade was likely to be higher in classrooms offering higher levels of classroom organization quality. The individual level of the model explained 45.3% and 4.7% of the variance in engagement in kindergarten and first-grade, respectively. The model additionally explained 33.9% of the between-classrooms variance in first grade engagement.

A second model was performed using *teacher-reported* behavioral engagement in first grade as the outcome variable. This model also showed adequate fit:  $\chi^2(8) = 16.01$ , *ns*; CFI = .916; RMSEA = .08, SRMR (individual level) = .048; SRMR (classroom level) = .038. The results were quite similar to the previous model. At the individual level, children's inhibitory control ( $\beta = .24$ ,  $SE = .09$ ,  $p = .008$ ), teacher-child closeness ( $\beta = .31$ ,  $SE = .08$ ,  $p < .001$ ), and perceived peer-teacher conflict ( $\beta = -.34$ ,  $SE = .10$ ,  $p < .001$ ) directly contributed to behavioral engagement at the end of kindergarten, which, in turn, was associated with teacher-reported engagement in first grade ( $\beta = .54$ ,  $SE = .07$ ,  $p < .001$ ). The indirect effects of teacher-child closeness, perceived peer-teacher conflictual relationships and child inhibitory control were statistically significant (respectively, estimate of indirect effect = 0.06;  $SE = 0.03$ ;  $p = .03$  for closeness; estimate of indirect effect =  $-0.07$ ;  $SE = 0.07$ ;  $p = .03$  for

peer–teacher conflict, and estimate of indirect effect = 0.06;  $SE = 0.03$ ;  $p = .03$  for self-regulation), suggesting that engagement in kindergarten mediated the association between these three predictors and teacher-reported engagement in first grade. Finally, at the class level, classroom organization ( $\beta = .65$ ,  $SE = .07$ ,  $p < .001$ ) also positively predicted teacher-reported engagement in first grade. The variance explained at individual level was 40.8% and 29.1% for engagement in kindergarten and first-grade, respectively, and the classroom level, 42.0% for teacher-reported first grade engagement.

### Discussion

Framed by systemic-ecological models, this study sought to understand the joint contributions of child self-regulation and classroom contextual factors at the dyadic and the classroom level to children's behavioral engagement in learning during the transition to primary school. In addition to dyadic teacher-child closeness and conflict and to the overall classroom organization climate, this study also addressed the role of conflict between the teacher and the classroom peers as a relevant classroom contextual variable. Two main findings emerged. First, higher levels of inhibitory control, closer teacher–child relationships and lower levels of perceived peer–teacher conflict contributed to higher levels of behavioral engagement in kindergarten, which in turn was associated with both higher levels of observed and teacher-reported engagement in first grade. Second, behavioral engagement in kindergarten combined with the quality of the classroom organization to predict behavioral engagement in first grade, such that children with higher levels of behavioral engagement in kindergarten attending classrooms with higher levels of classroom organization were observed and reported by teachers as more engaged in first grade. Taken together these findings offer insight into

the factors that contribute to behavioral engagement and extend prior work by testing a comprehensive model that considers simultaneously individual, dyadic, and classroom factors over a two years period.

### **Stability across kindergarten and first grade**

Our results suggest moderate stability in behavioral engagement across the kindergarten and first year of primary school. These results are particularly important because the associations are consistent across different measures (teacher reports and observations) and raters (kindergarten and first grade teachers). Our findings conform to previous longitudinal research in the upper elementary school years (Ladd & Dinnella, 2009) and extend it to the transition period. Even though children experience several changes from kindergarten to first grade, our results support the view that children may develop early engagement orientations that characterize their ways of relating to activities in the classroom that are sustained throughout this cross-grade period (Ladd & Dinnella, 2009). It is important to note that the percentages of young children attending early childhood services are increasing throughout the western countries, with some European countries, like Belgium, providing nearly universal preschool access for young children. More and more children, by the time they enter primary school, are likely to have already attended a number of educational settings, with implications for their positive adaptation to the classroom demands from very young ages. In the particular case of Belgium, group sizes in preschool and kindergarten are very high and similar to primary school (OECD, 2006), which can also contribute to greater stability on engagement across years than that could be found, for instance, in the United States. It will be important to further investigate individual patterns of continuity and change in early school engagement, starting in early childhood, especially in different countries.

This study makes a first step by using a multi-method approach, contributing to provide a more comprehensive picture of behavioral engagement in learning.

### **Inhibitory control and behavioral engagement in learning**

Our findings indicate that children with higher self-regulation skills (i.e., more inhibitory control) were perceived by their teachers as showing higher levels of behavioral engagement in learning in the classroom. Consistent with recent theory (Blair, 2002), it appears that self-regulation skills, such as paying attention, waiting for his/her turn, inhibiting off-task behavior may help children to respond to the demands of the classroom. These findings are consistent with previous studies highlighting that children's self-regulation abilities may be critical to their behavioral engagement in learning (Brock et al., 2009; Rimm-Kaufman et al., 2009) and add to existing literature regarding the importance of such temperament-based skills, in particular, the inhibitory control, to children's independence and initiative in the classroom across kindergarten and first grade.

### **Teacher-child relationships and behavioral engagement in learning**

As expected, our findings indicated that children who have closer teacher-child relationships display higher levels of behavioral engagement in the classroom. Previous research has documented that higher levels of closeness may afford children to openly express their needs and feelings, helping them to ask for the appropriate level of support that will contribute to enable them to work independently and responsibly (Birch & Ladd, 1997). In addition, it is possible that children with closer relationships may be more willing to learn effective ways to behave in the classroom. In contrast, despite statistically significant zero-order correlations, teacher-child conflict was not a significant unique predictor of behavioral engagement in the models. Several studies



have suggested differential effects on child outcomes for teacher–child closeness and conflict (Birch & Ladd, 1997; Liew et al., 2010; Silver et al., 2005). Conflict has been found to relate to problematic behaviors in the classroom and to negative adjustment (Birch & Ladd, 1997; Hamre & Pianta, 2001; Ladd & Burgess, 1999; Pianta & Stuhlman, 2004). Closeness, on the other hand, has been linked to positive adjustment in school (Birch & Ladd, 1997; Hughes & Kwok, 2006; Hamre & Pianta, 2001). Furthermore, it has been suggested that teachers' perceptions of conflict may be particularly influenced by child characteristics, while teacher–child closeness may essentially reflect teacher-driven effects and thus be more indicative of classroom-level teacher's efforts to form close relationships with all children. While it is expected that both child and classroom predictors will affect behavioral engagement, it is possible that behavioral engagement may be particularly sensitive to classroom-level variables. Therefore, the associations between closeness and behavioral engagement may reflect contextual contributions through teachers' sensitive and responsive support. It is also important to note that conflict and closeness were moderately related and it might be the case that the variance attributed to conflict was sufficiently captured by teacher–child closeness, and thus such non-significance may indicate that conflict does not contribute to engagement beyond closeness.

### **Perceived peer–teacher conflict and behavioral engagement in learning**

One of the aims of this study was to examine how individual teacher–child relationships and perceived peers' conflict with the teacher operate simultaneously to shape behavioral engagement. Our findings showed support for the negative effects of perceived peer–teacher conflicted relationships on behavioral engagement in learning. As expected, higher levels of conflict between peers and teacher appeared to be

associated with lower individual levels of behavioral engagement. Perceived peer–teacher conflict may reflect, to a certain extent, a challenging climate for both teachers and children characterized by negative and hostile expressions of affect. Our findings suggest that, regardless of the levels of conflict with a particular child, this particular child can be adversely affected by a high proportion of problematic relationships in the classroom. Hence, it is reasonable to expect that higher proportions of hostile and problematic relationships may be more powerful in predicting behavioral engagement than individual teacher–child conflict because of its effects on the overall classroom climate. Adding our assumptions about the effects of closeness, a question that deserves further study is whether behavioral engagement is more affected by features that occur at the classroom level or by features that operate essentially at individual level. Importantly, this study represents the first attempt to examine whether perceived peer–teacher conflict contributes to children's engagement and thus our findings make an important contribution to the existing body of knowledge.

### **Classroom organization and behavioral engagement in learning**

A final contribution of this study was to test whether the quality of classroom organization contributes to behavioral engagement while considering individual and relational factors. The findings showed that classroom organization was a significant contributor of behavioral engagement in learning. Children were observed to be more engaged in classrooms where teachers used proactive behavior management strategies, established predictable routines, and made a productive use of time. Those strategies appeared to help children to spend more time in the activities. Our results substantiated the view that the use of proactive approaches can help minimize disruptive behavior that may undermine behavioral engagement and that, in addition, setting up consistent and

predictable routines can help children to better know what to expect and what is expected from them contributing to their engagement in the task (Cameron et al., 2005; Ponitz et al., 2009). Our findings are in line with previous studies showing links between higher classroom organization quality and higher achievement and engagement (Cameron et al., 2008; Pianta et al., 2002; Rimm-Kaufman et al., 2005, 2009). The present study further supports the importance of teachers' role in creating predictable and efficiently managed environments in first grade, helping children to sustain their involvement in classroom activities.

Taken together, these findings point to the important role of classroom climate and social relationships, as well as children's inhibitory control for behavioral engagement in learning. Considering that the transition to primary school represents a major event in children's school trajectories (Pianta & Rimm-Kaufman, 2006), these results are clearly important. In addition, our results are consistent across multiple measures (observation and teacher report), providing stronger support for the importance of these variables to child engagement in the classroom.

### **Study limitations and future directions**

Our findings should be considered in light of several limitations. First, the sample size at level 2 was rather low, which may lead to less accurate estimates at that level (Maas & Hox, 2005). In addition, cluster size in first grade was unequal, with participants ranging from 1 to 9. Although the percentage of classrooms with few children was small (nearly 10%) and it has been shown little to no bias in the estimates of the fixed effects when there are varying cluster sizes (Bell, Ferron, & Kromrey, 2008; Clarke & Wheaton, 2007), the standard errors at the second-level may be less accurate (Maas & Hox, 2005). Third, even though the perceived peer-teacher conflict scores

were computed based in a larger sample, with an average of almost 8 peers, a more reliable estimate would need to include the scores of all children in the classroom. Moreover, the number of peers from which the peer–teacher conflict was computed was also unequal across children, and therefore the results should be interpreted cautiously. Fourth, although our study focused on unique effects of various factors, the rather small sample size prevented us from examining the interactive effects between child inhibitory control and dyadic and classroom-level attributes. Future research may thus focus on the identification of contextual and relational features that may worsen or compensate the effects of low levels of inhibitory control on behavioral engagement. Overall, our results suggest that jointly targeting teacher relationships and classroom organizational climate can offer complementary contributions to children’s behavioral engagement in learning.

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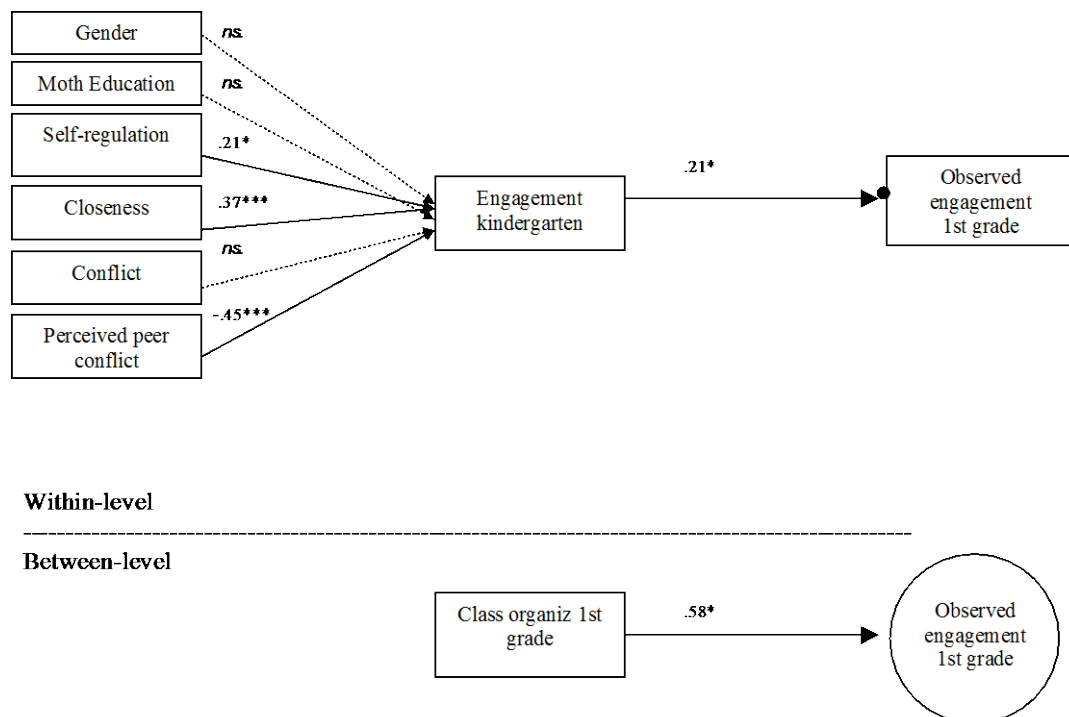
Table 1

*Descriptives, Within-level and Between-level Correlations of the Observed Variables (Maximum Likelihood Estimates)*

	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1. Observed engagement 1 <sup>st</sup> gd									.78	.17
2. Teacher-reported engagement 1 <sup>st</sup> gd									2.45	.50
3. Teacher-reported engagement k	.21**	.53**							2.56	.45
4. Self-regulation	.10	.21**	.29**						.04	.98
5. Closeness	.09	.26**	.44**	.07					4.21	.65
6. Conflict	-.23**	-.27*	-.16*	-.13*	-.32*				1.53	.56
7. Perceived peer–teacher conflict	-.08	-.08	-.45**	-.04	-.02	-.24**			1.52	.36
8. Child gender <sup>a</sup>	-.15	-.29**	.15	-.04	-.21**	.26**	.02		.51	
9. Mother education	.08	.32**	.13	.14	.13	-.14	-.04	-.13	4.27	1.22
10. Class organization	.48**	.61**							4.88	0.92

<sup>a</sup>0 = girl

\*  $p < .05$  \*\* $p < .01$



*Figure 1.* Multilevel analysis of the contributions of self-regulation, teacher-child relationships and classroom interactions to observed engagement in learning in first grade. Coefficients are standardized.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

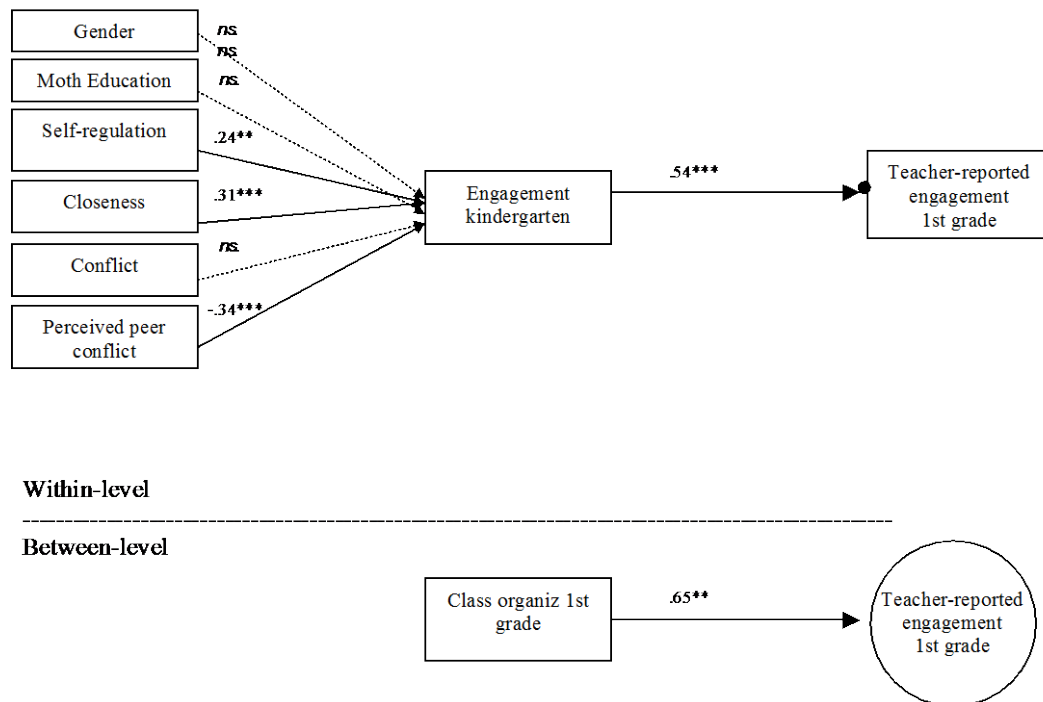


Figure 2. Multilevel analysis of the contributions of self-regulation, teacher-child relationships and classroom interactions to teacher-reported engagement in learning in first grade. Coefficients are standardized.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$